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ENERGY

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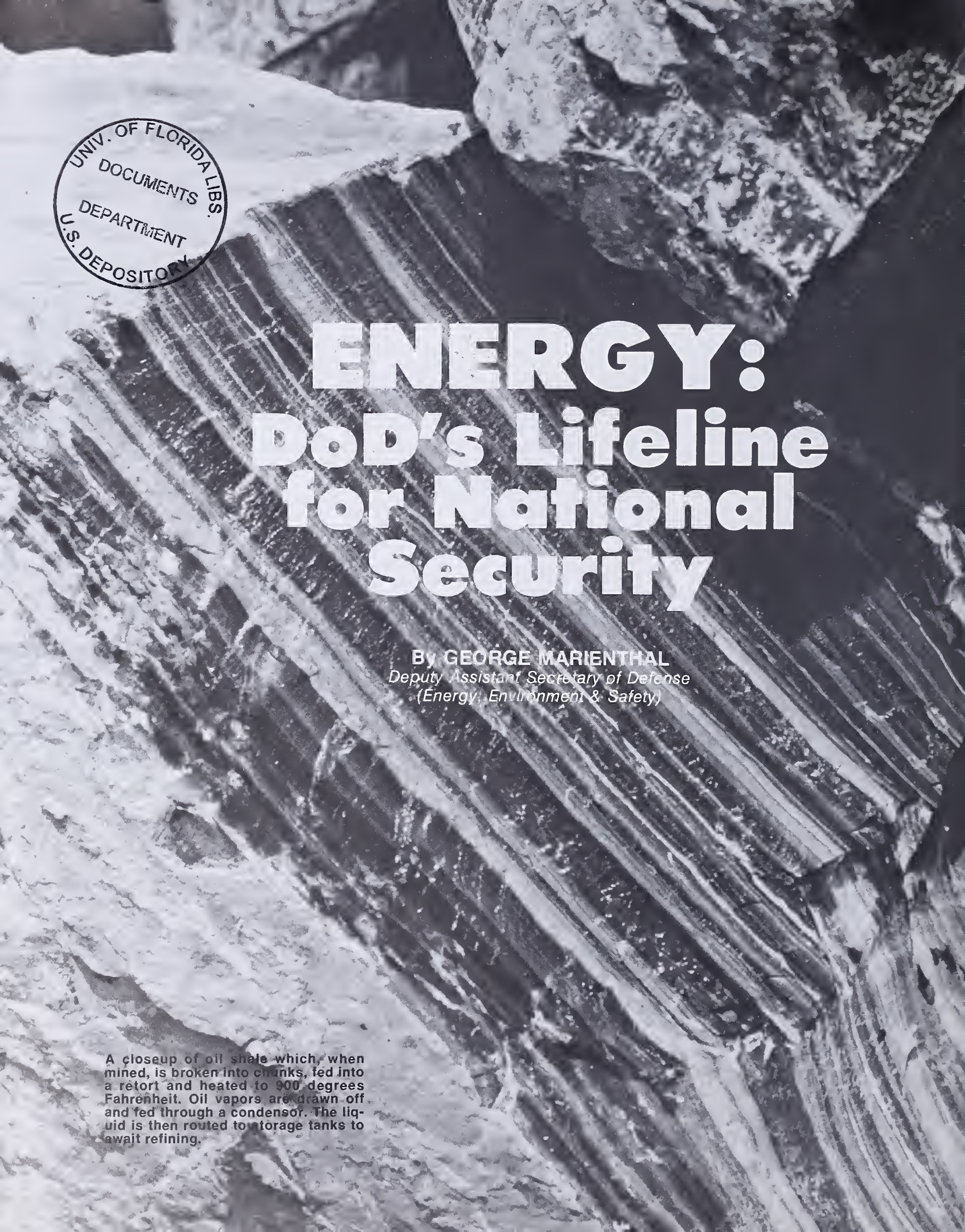

ENERGY: DoD's Lifeline for National Security

By GEORGE MARIENTHAL
Deputy Assistant Secretary of Defense
(Energy, Environment & Safety)

A closeup of oil shale which, when mined, is broken into chunks, fed into a retort and heated to 900 degrees Fahrenheit. Oil vapors are drawn off and fed through a condensor. The liquid is then routed to storage tanks to await refining.

From a national security viewpoint, the Department of Defense strongly supports the Administration's National Energy Plan. Our extraordinary dependence on foreign oil threatens our national security. I am not referring to an energy shortfall, but rather, a potential energy disaster. The consequences of that disaster are not a simple matter of convenience or inconvenience, comfort or discomfort, inflation and unemployment, even though all of those are involved. At stake—beyond our comfort, beyond our convenience, beyond our prosperity—is the physical security of the United States and the world as we know it.

Secretary of Defense Harold Brown summed up the matter as follows:

"The present deficiency of assured energy resources is the single surest threat . . . . to our security and to that of our allies."

Those of us who are in the Defense Department know that security is rooted in more than tanks, ships, planes, and missiles. It depends, in the final analysis, on the functioning of the economy and society of the United States. The economy of the United States depends on oil. The economies of U.S. allies depend on oil. The economies of The Third World developing nations depend even more acutely on oil. In spite of all the warnings, the United States has been importing, day after day, month after month, increasing millions of barrels of oil—upwards of 45 per cent of our national requirements. The safety of the sources and means of transportation of imported oil cannot be assured in time of war—even a war to which we were not a party. To cut off those millions of barrels, suddenly, would be a wrench such as our society has seldom experienced—a blow to a spot which we ourselves have made vulnerable. To leave others with the capacity to cripple us is to leave ourselves, and our friends, handicapped and perpetually insecure.

In the event of international disruptions of supplies, the United States can be a nation of strength or a nation of weakness. Our ships, our tanks, and our planes are not the sole determinants of our own ability to endure. This Nation's defense is no less built on our economy and our relations with our allies; and those depend on what we now do about our energy problem.

> ***"In each period of our history, the Nation has responded to challenges which have demanded the best in all of us.***
>
> ***This is one of those times.***
>
> ***Our energy crisis is an invisible crisis, which grows steadily worse—even when it is not in the news. It has taken decades to develop, as our demand for energy has grown much faster than our supply. It will take decades to solve. But we still have time to find answers in the planned, orderly way—if we define the changes we must make and if we begin now."***
>
> Jimmy Carter

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In a real sense that series of small—but cumulatively vital—decisions by which we in DoD and the rest of society save or squander energy will truly affect this Nation's security. Similarly, the legislative process will determine whether we collectively move to protect ourselves against an assuredly crueler tomorrow.

The Department of Defense's responsibility for national security is, therefore, heavily dependent upon the assured availability of energy in all forms, and petroleum in particular. For the near term, mid term, and long term, the maintenance of world peace and national security is, and will continue to be, energy intensive.

We recognize that we will have to continue to give energy considerations a very high priority. As we develop military equipment, and as we procure supplies and material, we must insure that energy trade-off factors are put more fully into the equations. Where critical materials and manufacturing processes depend upon energy in all forms, we must revise our acquisition process to bring those points to the forefront.

In order to achieve further results, significant energy reductions in operations will be dependent on incorporating energy saving features in our weapon systems. The right time to put those features into new systems is during the development phase. Thus, a considerable amount of time will elapse before systems are actually placed in the field and before larger energy savings can be realized.

In order to insure Defense readiness, energy trade-offs must be reflected in planning for operations and training. Our efforts in aircraft simulators, in placing ships in cold iron, and in reduced steaming and flying hours are examples.

DoD has made great strides to conserve scarce energy resources in daily operations. Increased energy costs, combined with extensive conservation efforts, have caused the Defense Department to operate closer to the readiness margin than might otherwise be countenanced. There has been a strong consensus among the Joint Chiefs of Staff and the Military Departments that recent petroleum

DEFENSE NEWS BRIEFS

DACOWITS Gets Prominent Position

The Defense Advisory Committee on Women in the Services (DACOWITS) has been placed directly under the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics to strengthen the committee in accomplishing its mission.

DACOWITS, composed of prominent civilian women from across the Nation appointed by the Secretary of Defense, has served in an advisory capacity since 1951, contributing recommendations to DoD on policies and practices affecting recruiting and retention of women. Committee members also serve as contacts between the Services and civilian communities, promoting the attractiveness and advantages of military service as a career field for women.

Increased importance of the committee's role is being emphasized as Pentagon manpower planners seek expanded utilization of women as a high-quality, cost-effective resource in sustaining the all-volunteer force.

DoD Lets Contract To Minority Firm

The Department of Defense has let one of the largest defense contracts ever awarded to a minority-owned firm. Technology Development Corp. of Sunnyvale, Calif. was awarded a nearly $3.5 million contract for F-16 research, development and related technical services.

The signing of the contract reflects continuing efforts to meet the President's goal of doubling the purchase of goods and services from minority-owned firms through direct and indirect procurement during the next two fiscal years.

Contract Talks Set For Army's New Gun

Army plans to enter contract negotiations with the Pomona Division of General Dynamics and with the Aeronutronic Division of Ford Aerospace and Communications Corporation for full scale engineering development of the new Division Air Defense (DIVAD) gun.

DIVAD will be an all-weather, radar-directed 35 or 40 mm cannon in twin mounts in an armored turret, mounted on a M48A5 tank chassis.

In an accelerated, 29-month development period, each contractor will deliver two production prototypes for competitive testing and eventual selection of one contractor.

TRIDENT Problems Include Cost, Delay

Revised Navy cost estimates of the lead TRIDENT ballistic submarine, indicating a $400 million growth above the 1974 estimate of lead ship cost, were sent to Congress recently. Inflation, material price rises and increased wages were cited as the primary reasons for cost growth.

The contractor—Electric Boat Division of General Dynamics—notified the Navy in July that the lead TRIDENT submarine would be delayed six months and be delivered in October 1979. Navy expects another six-month delay, which will put delivery in April 1980 and the sub's first deterrent patrol in 1981.

D2.15/2:20/22

consumption levels of the operating forces have been, at best, marginally adequate to maintain force readiness. Further reductions in energy for operational use would be detrimental to Defense readiness. We must, therefore, report a projection of slight upward growth in petroleum consumption through Fiscal Year 1985 of a little more than three per cent.

Budgetary constraints make it imperative that DoD expenditures for energy programs clearly contribute to the maintenance of military readiness. They do not, however, preclude our participation in programs that are funded by other Federal agencies, such as the Department of Energy (DoE). In addition, because of the rapidly evolving nature of energy technology, Defense is aware of the importance of maintaining comprehensive and flexible planning and programming to assure utilization of the most current, cost-effective technology.

DoD is the largest single user of the Nation's energy. We account for approximately 1.7 per cent of the total national consumption. When Defense related industries are considered, this consumption level increases to approximately five per cent. Our peak petroleum requirements, the amount estimated to support full wartime conditions, increases by a factor of three or more.

CURRENT REQUIREMENT

The current energy requirement is equivalent to approximately 650,000 barrels of oil per day. Almost 67 per cent of that demand, or approximately 470,000 barrels per day, is for liquid petroleum products.

Electricity accounts for approximately 22 per cent of the demand, followed by natural gas, at eight per cent, and coal, at three per cent.

The total DoD energy requirement distributed among the Military Departments is: 49 per cent for the Air Force, 32 per cent for the Navy, and 19 per cent for the Army. Further, the end use requirements are:

- 44 per cent for aircraft operations,
- 40 per cent for installation support,
- 11 per cent for ship operations, and
- 5 per cent for ground operations.

The Defense Energy Program not only supports an aggressive conservation effort, but also supports efforts designed to reduce dependence on petroleum through utilization of renewable resources and synthetic fuels.

Defense's major new initiatives are in the areas of solar applications, photovoltaics, geothermal, refuse derived fuel, and synthetic fuels.

SOLAR APPLICATIONS

The DoD and DoE have committed approximately $10 million and $5.5 million, respectively, for the installation and testing of solar heating and cooling systems.

PHOTOVOLTAICS

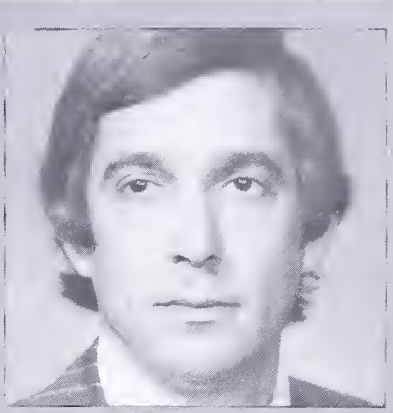
The photovoltaic (solar cell) power system provides a promising means to convert solar energy directly into electricity. The process is quiet, pollution free, operationally simple and, unfortunately, at present, expensive. Two facts make photovoltaic power particularly attractive for military applications:

- their simplicity, and
- the ability to combine the same cell modules to create systems of varying size.

DoD is pursuing many photovoltaics applications.

Photovoltaic power is being installed and used at numerous small remote locations. Those applications offer near-term benefits, including cost and logistics savings. Portable equipment and off-shore locations are also candidates for photovoltaic applications. DoD is continuing to evaluate the use of photovoltaics for selected applications where there is a possibility that the high initial cost will be offset by reduced operating costs, or when costs are justified by an increased mission capability.

Consideration is being given to using DoD to provide an initial market for more rapid commercialization of photovoltaics. Defense planning is underway to support such consideration.



George Marienthal

George Marienthal is Deputy Assistant Secretary of Defense for Energy, Environment, and Safety. Prior to assuming his present position, he served as Director of the Office of Regional Liaison, Environmental Protection Agency in Washington, D.C.

Marienthal was graduated in the top 15 per cent of his class at the U.S. Naval Academy in 1962. He received a B.S. degree in General Engineering. He earned a M.S. degree in Industrial Engineering in 1963 from Stanford University in California. He received an MBA degree in Managerial Economics in 1977 from American University in Washington, D.C.

Secretary Marienthal also has held positions as: a senior research associate with the Logistics Management Institute, Washington, D.C.; Development Engineer, Air Force Contract Management Division, Los Angeles; Air Force Plan representative for Lockheed Missile and Space Co., Sunnyvale, Calif.

GEOTHERMAL

With the help of other Federal agencies, DoD has been active in geothermal activities. Most of the effort has been concentrated on exploratory work at Adak, Alaska and at the Naval Weapons Center, (NWC), China Lake, Calif.

Results from geophysical studies that the U.S. Geological Survey (USGS) conducted at Adak during 1976 and 1977 resulted in selection of a promising drilling site. The site is within five miles of the Navy facilities. If successful, it could provide both electrical power and fluids for heating. Even at zero growth rate and zero fuel cost escalation, a geothermal system at Adak could pay for itself in less than eight years, according to our study. Exploratory drilling at Adak, which began during the summer of 1977, has been completed.

The Defense Department recently completed an economic utilization study at NWC, China Lake, which compared the geothermal energy approach with other approaches, such as conventional fuels, wind systems, and a small nuclear power plant. The geothermal reservoir at NWC, China Lake, is thought to have an electrical generating potential of up to 4,000 megawatts (MW), based on DoE estimates. Exploratory drilling has already begun with DoE funding. The Navy is providing support for the exploration activity in the areas of safety, scheduling, environmental management, site preparation, and consideration of specific Navy requirements. Environmental assessments for geothermal development at China Lake have been initiated in cooperation with the Bureau of Land Management and the State of California.

In addition to those two sites, DoD is studying development of the geothermal field on Oahu, Hawaii. The Navy has already met with industry representatives. If the field is developed, the Navy plans to purchase electricity from the producer. Navy involvement in the development of the Oahu field will be limited to overseeing safety operations and to ensuring maintenance of Navy missions and security procedures on the installation.

REFUSE DERIVED FUEL

Under the Resource Conservation and Recovery Act of 1976, Defense is assessing the feasibility to construct resource recovery facilities in 13 standard metropolitan statistical areas (SMSA). These feasibility studies are presently being completed. Recommendations to use refuse derived fuel (RDF) will be made to the Environmental Protection Agency and to local and State governments, as appropriate.

In the Norfolk-Hampton Roads area, for instance, the Navy has in place two water-walled boilers for steam generation using RDF. These two boilers, the first constructed in 1967, and the second which is presently in "shake-down," have a combined capacity of 320 tons per day (TPD).

Other areas have been identified where it would be feasible to take the combined waste generated from Federal facilities and the private sector and burn it to generate steam and/or electricity.

In most cases, non-DoD agencies have assumed the lead. In the San Francisco-Oakland area, for example, facilities are planned with a combined capacity of nearly 4,000 TPD of solid waste. Markets have been identified (which include military facilities) to consume the steam or electricity which would be generated from use of the RDF.

SYNTHETIC FUELS

The Defense Department began investigating fuels in FY 1974 when DoE (formerly the Energy Research and Development Agency) provided the Navy with 1,238 barrels of synthetic crude for test and evaluation. Completion of preliminary tests on the distilled

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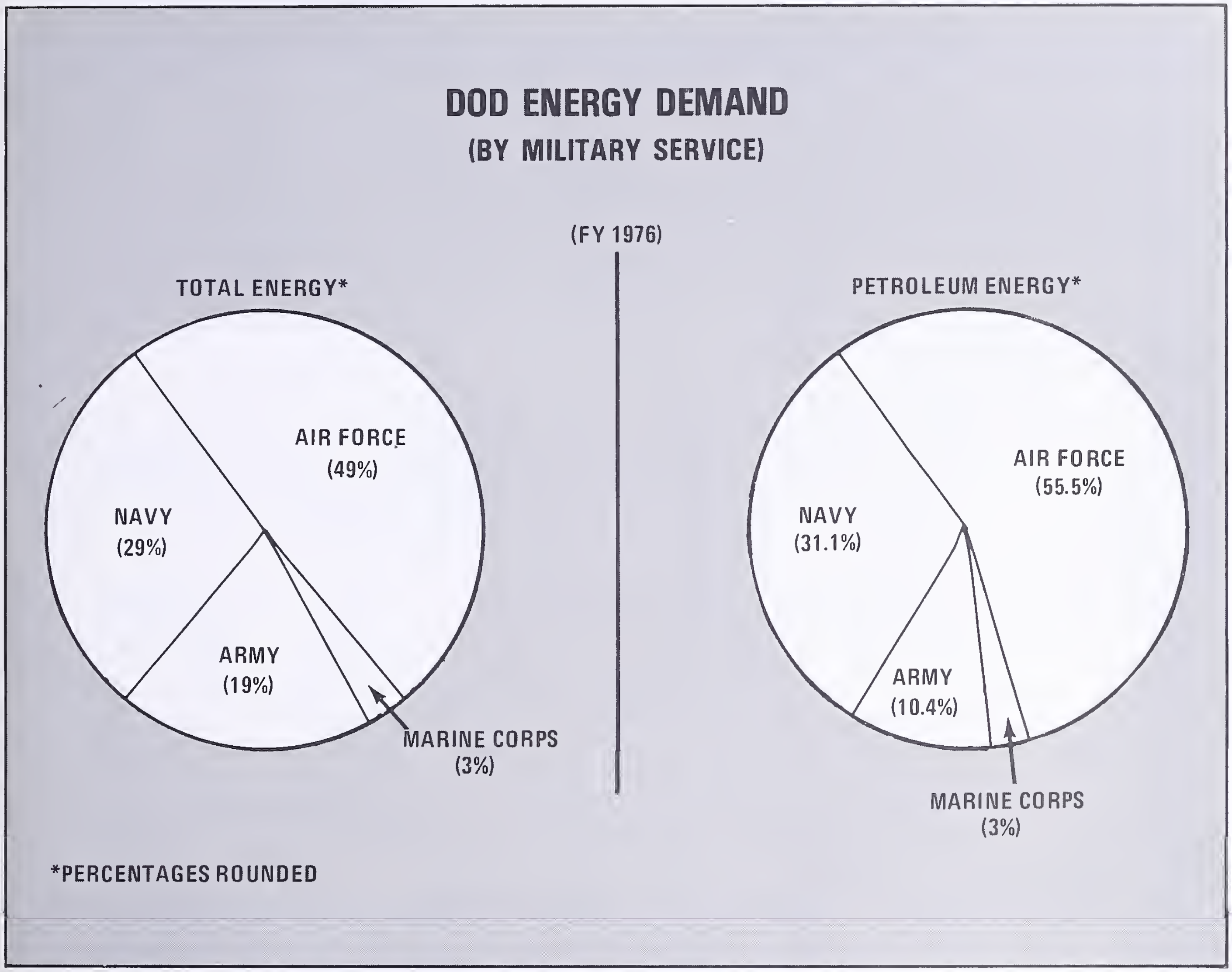
WHAT THEY ARE SAYING . . .

“Let me state that it is the position of the Office of the Secretary of Defense and the Joint Chiefs of Staff, that the Panama Canal is a major defense asset of strategic military importance and will remain so for the foreseeable future. Its principal value lies in the flexibility it provides in transferring our ships rapidly from one ocean to another. It is especially valuable as it applies to our logistical and amphibious shipping. It is because of its value that DoD is interested in a treaty arrangement which maximizes the possibility that we can continue to use the canal in peace and war in the future.”

—LT. GEN. W.G. DOLVIN, *USA (Ret.), OSD-JCS Representative on the Panama Canal Treaty, before the House Merchant Marine and Fisheries Committee, Nov. 30, 1977.*



> ***I believe the United States, and the Free World as a whole, prefer cooperation to competition. Yet, in seeking a better world, Soviet military capabilities cannot be overlooked. Trends that indicate increasing Soviet nuclear and conventional strength on land, sea, and in the air cannot be denied. The growth of Soviet global reach and increasing evidence of Soviet intent to assert its influence in other areas are clear.***

—GEN. GEORGE S. BROWN, USAF, *Chairman, Joint Chiefs of Staff, before the Royal United Services Institute for Defence Studies at London, England, Dec. 2, 1977.*

> ***At the direction of Secretary Brown, the Services have now developed plans under which they will attempt to greatly increase—to almost double—the number of enlisted women in the next five years. We believe this effort will be one of the most important factors in sustaining the all-volunteer force. If the Services can achieve these goals, women, who are slightly more than five per cent of the force today, will be 11 per cent of the force in 1983.***

—M. KATHLEEN CARPENTER, *Deputy Assistant Secretary of Defense (Equal Opportunity), before the Defense Advisory Committee on Women in the Services (DACOWITS), Oct. 30, 1977.*

FLARE

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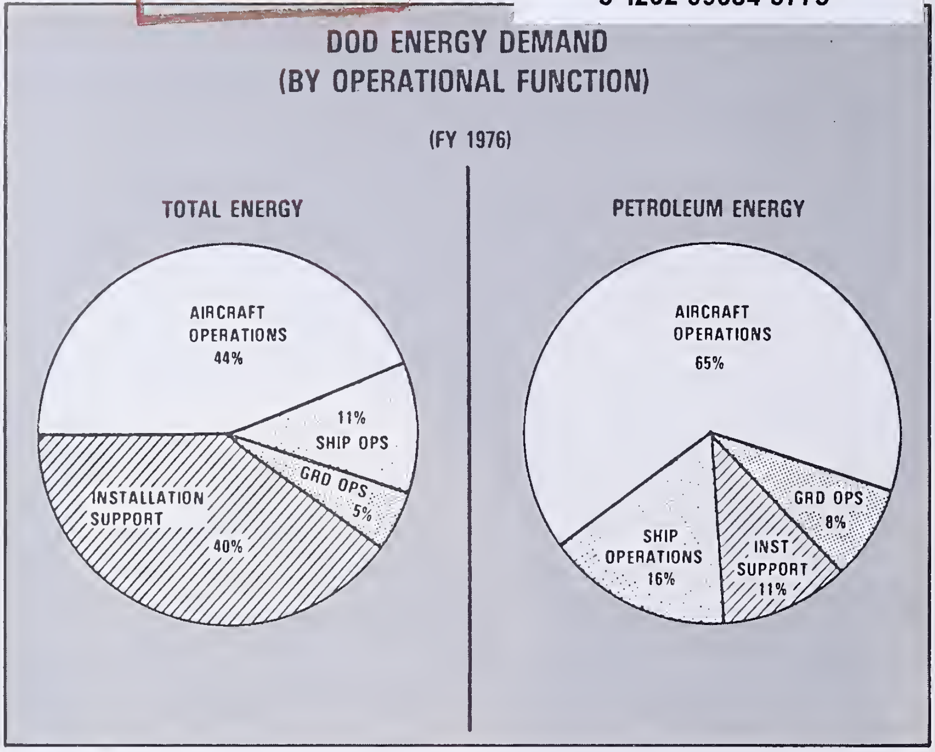


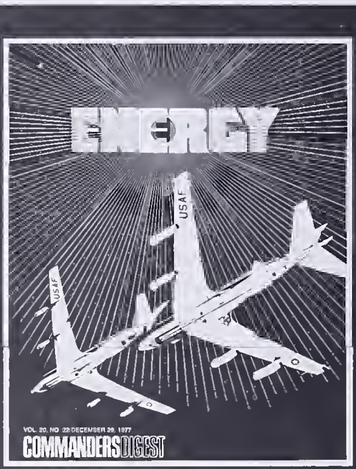
crude was culminated in a sea-trial demonstration with the U.S.S. Johnston. The results of those tests indicated that the characteristics of some synthetic fuels are similar to those of conventional, petroleum-based fuels used in Navy boilers. We later determined that synthetic fuels could also be a potential source of jet fuels, provided additional processing was achieved.

In 1974, the Department of Defense, Maritime Administration (MARAD), Coast Guard, National Aeronautics and Space Administration (NASA), and DoE established a joint project to evaluate other shale oil products. Results of many tests indicated that, in a majority of cases, the performance characteristics were within the normal range for the particular hardware used in the tests. Much work remains, however, before we can conclusively demonstrate the use of crude shale oil as a feedstock for bulk military fuels.

A new project was started in 1976 to refine 50,000 to 100,000 barrels of shale oil crude into a spectrum of military specifications fuels in a typical commercial-scale refinery. The Army, Navy, Air Force, NASA, and DoE will test those products to determine the performance and compatibility with military equipment.

The Navy has let approximately $4.8 million in contracts to refurbish a crude shale oil production facility, to produce the first increment of crude shale oil, and to store 90,000 barrels of additional crude oil at the production site. In addition, the Navy has completed contract negotiations to carry out the initial investigations preparatory to refinement of the crude shale oil. The present contracts will provide 65,000 barrels of crude shale oil. The Navy is prepared to contract for an additional 35,000 barrels when DoE provides the $3 million necessary to refine the total of 100,000 barrels of crude shale oil into military products. The present schedule calls for refining to commence in late Fall of 1978, and actual testing in military equipment should begin in January 1979. The Naval Petroleum Reserve has recently been transferred to DoE.

In summary, the Defense Department is a large consumer of energy, heavily dependent upon petroleum for mission accomplishment. Because of our need for energy, we are a leader in energy conservation initiatives, as our record indicates, and, we are pioneers in the application of new energy technology.



COVER: Air Force KC-135 Stratotanker refuels B-52 bomber. The Air Force uses 49 per cent of the DoD energy requirement.

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